

60°; inner clasper slender, bladelike, arcuate with a small hook at the apex; penis simple, tubular.

Female.—Differs in sexual characters and in those indicated in the generic description.

Holotype.—Male, U.S.N.M. no. 57286, 63 km from Mexico City in the State of Morelos, January 1944 (J. G. Shaw), from *Eucheira*

socialis Westwood, on *Arbutus* sp., Shaw no. 5047.

Described also from the allotype, female, and paratypes, 1 male and 1 female, same data, and from a series of specimens, mostly in poor condition, only 1 male and 1 female being considered paratypes, from Morelos, Mexico, February 1944 (J. G. Shaw), from *Eucheira socialis* on *Arbutus* sp., Shaw no. 5049.

ICHTHYOLOGY.—*The leatherjackets, carangid fishes of the genus Oligoplites Gill, inhabiting American waters.*¹ LEONARD P. SCHULTZ, United States National Museum.

This study was undertaken in an attempt to determine the valid scientific name for the leatherjacket, or palometa, inhabiting the brackish and fresh waters of Lago de Maracaibo, Venezuela, and also to try to straighten out some of the confusion centering around the other species of the Western Atlantic Ocean. I have examined nearly all the specimens of this genus in the U. S. National Museum, and they form the basis for my conclusions. Although not all the records in the literature are included in the synonymy for each species, most of the important ones are listed except for *saurus* along the Atlantic coast of the United States, where it is not confused with any related species. I do not see how one is justified in recognizing the subgenus *Leptoligoplites* Fowler (Acad. Nat. Sci. Philadelphia Monogr. 6: 223. 1944; genotype, *Oligoplites refulgens* Gilbert and Starks) on the basis of a few more gill rakers and elongate form. The differences in dental structures would be a much better characteristic on which to establish subgenera if such were needed, but I do not think it necessary in this otherwise distinct group.

Dr. T. Gill (Proc. Acad. Nat. Sci. Philadelphia, 1863: 166) proposed the genus *Oligoplites* with *Oligoplites inornatus* Gill as genotype, thus separating the Eastern Atlantic and African species with a few more dorsal spines from related species in American waters. The genus is easily recognized by the "mackerel form" of the com-

pressed body; the two free anal spines at the front of the anal fin; lunate-shaped caudal fin; long anal and dorsal fin with all of the soft rays connected by membrane so that no free finlets occur; skin without external scales, although covered with fine ridges, representing minute embedded scales that extend at slightly different angles; lateral line unarmed, running along the middle or lengthwise axis of the body, and a little arched over the pectoral fin; dorsal profile anteriorly with a low keel; head short, compressed, somewhat pointed; the greatest depth of body near origin of second dorsal; mouth oblique, large, the lower jaw projecting slightly; premaxillaries not protractile, the premaxillary groove not continuous across tip of snout; maxillary narrow, long, reaching to under rear of orbit or past it, without supplemental bone; teeth present on premaxillaries, vomer, palatines, dentary and tongue; those on dentary in the young and half grown with an outer row that flares outward, curving dorsally so that the band of teeth in the upper jaw fits into the trough made by these numerous curved teeth, but these appear to be lost so that the adult has a row of much less closely spaced teeth that are less curved and coarser; gill rakers long; dorsal spines usually IV or V, rarely III or VI, connected at base by a low membrane; anterior rays of soft dorsal and anal fins somewhat elevated anteriorly, but with deep notches between the rays posteriorly; pectoral fins short; gill membranes extending far forward with a small delicate membrane connecting across the isthmus anteriorly; pelvics fitting into a groove, in-

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served under the pectoral fin bases.

Numerous counts were made on the various species studied and these are recorded in Table 1.

KEY TO THE SPECIES OF OLIGOPLITES

- 1a. Number of gill rakers, including rudiments, on first gill arch, 5 to 7 + 1 + 16 to 21; dorsal surface of head without a network of tubes opening through numerous pores on surface of skin; mucous pores however, appear to develop more numerous on adults with increase in size.
- 2a. Premaxillary with a single row of short conical teeth along its entire length, except in young about 85 mm and shorter this row irregular or nearly in 2 rows anteriorly at front of snout; toothed portion of vomer a patch, usually a trifle longer than wide and somewhat bluntly pointed posteriorly; teeth on dentary in 2 distinct rows; dorsal rays IV-I, 20 or 21; depth 3 to 3.4; head 1.3 in young, 1.4 to 1.6 in adults; posterior margin of maxillary more or less truncate; Central America and West Indies to Montevideo, Uruguay. *Oligoplites saliens* (Bloch)
- 2b. Premaxillary teeth (65 mm in standard length and shorter) in 1 or 2 rows posteriorly, becoming a narrow band anteriorly; toothed portion of vomer much longer than wide, with a short, somewhat pointed, posterior projection; teeth on dentary in 2 rows; dorsal rays usually V-I, 19 to 21, rarely IV spines; depth 3.9 to 4.6; head 0.85 to 1.0; posterior part of maxillary angularly rounded; Pacific Ocean from Panama Bay to Guayaquil, Ecuador.
Oligoplites refulgens Gilbert and Starks
- 1b. Number of gill rakers, including rudiments, on first gill arch 3 to 6 + 1 + 10 to 15.
- 3a. Dorsal surface of head without an underlying network of tubes, opening to surface through numerous pores.
- 4a. Premaxillary with a band of villiform teeth along its entire length, posteriorly narrow, but anteriorly wide, consisting of several rows; toothed portion of vomer usually a little longer than wide, more or less pointed posteriorly; teeth on dentary becoming a band anteriorly; dorsal rays IV-I, 19 to 21, rarely V free spines; depth 3.4 to 3.8; head in greatest depth 1.2 to 1.4; posterior tip of maxillary rounded, reaching past orbits in adults; Nicaragua to Rio de Janeiro, Brazil, in Lake Yzabal, Guatemala, and in Lake Maracaibo, Venezuela.
Oligoplites palometa
(Cuvier and Valenciennes)
- 4b. Premaxillary teeth essentially in 2 distinct rows along its entire length except far posteriorly where it may become an irregular row, and far anteriorly near tip of snout where a minute row of teeth may occur between the two distinct rows; toothed portions of vomer on half-grown and adults much longer than wide, posterior projection more or less tapering to a point behind; teeth on dentary in 2 rows; dorsal rays V-I, 18 to 21, rarely IV or VI free spines; depth 3.4 to 4.1; head in greatest depth 1.0 to 1.6; posterior edge of maxillary rounded, usually not reaching past orbit.
- 5a. Premaxillary with 2 distinct rows of teeth, seldom with a few minute ones between them far anteriorly; gill rakers on lower limb of first arch usually 13 or 14 (11 to 14), counting rudiments; Woods Hole, Mass., southward in Gulf of Mexico and West Indies to Montevideo, Uruguay.
Oligoplites saurus saurus (Bloch)
- 5b. Premaxillary with 2 distinct rows of teeth and usually with some minute teeth between them anteriorly; gill rakers on lower limb of first arch usually 14 or 15 (13 to 16), counting rudiments; southern California and Gulf of California to Bay of Sta. Elena, Ecuador.
Oligoplites saurus inornatus Gill
- 3b. Dorsal surface of head with a network of tubes in skin opening to surface through numerous pores, these best developed in adults, scarcely so in young; premaxillary with a band of teeth, wider anteriorly, outer and inner rows a little enlarged; dentary with some teeth anteriorly between two outer rows; gill rakers 3 to 5 + 1 + 10 to 12; anal rays II-I, 19 to 21; greatest depth 2.7 to 3.2 in standard length.
- 6a. Tip of snout to rear edge of maxillary 1.7 to 1.8 in head, the latter 4.2 to 4.3 in standard length; length of pectoral fin a little longer than length of maxillaries; Panama to Guayaquil, Ecuador. . . *Oligoplites altus* (Günther)
- 6b. Tip of snout to rear edge of maxillary 1.4 to 1.6 in head, the latter 3.7 to 4.0 in standard length; pectoral fin a little shorter than length of maxillaries; Gulf of California to Callao, Peru.
Oligoplites mundus Jordan and Starks
- Oligoplites saliens** (Bloch)
Scomber saliens Bloch, Ichthyologie, Histoire naturelle des poissons 10: 41, pl. 335. 1792 (Antilles).—Cuvier and Valenciennes, Histoire

naturelle des poissons 8:389. 1831 (Martinique; Cayenne; Brazil).

Scombroides saliens Regan, Proc. Zool. Soc. London, 1903, 2: 66 (Rio de Janeiro).

Scombroides saltator Lacépède, Histoire naturelle des poissons 2: pl. 19 (opposite p. 596) upper fig., 1800; text, 3: 55. 1802.

Chorinemus saliens (var. *saliens*) Günther, Catalogue of the fishes in the British Museum 2: 475. 1860.

Oligoplites saliens Jordan and Evermann, U. S. Nat. Mus. Bull. 47: 899. 1896 (West Indies).—Fowler, Proc. Acad. Nat. Sci. Philadelphia, 1905: 60, fig. 2 (Rio de Janeiro).—Starks, The fishes of the Stanford Expedition to Brazil: 43. 1913 (Pará).—Fowler, Proc. Acad. Nat. Sci. Philadelphia, 1915: 532 (Trinidad); 1919: 129 (Rio de Janeiro).—Ribeiro, Arch. Mus. Nac. Rio de Janeiro 17: (Carang.) S. 1915 (Antilles to Rio de Janeiro; Bahia).—Meek and Hildebrand, Marine fishes of Panama, pt. 2: 390. 1925 (West Indies and Brazil).—Jordan, Evermann, and Clark, Rept. U. S. Comm. Fish. 1928, pt. 2: 277. 1930 (West Indies).—Devincenzi, Ann. Mus. Hist. Nat. Montevideo 4 (13): 24, fig. 9. 1939 (Rio de la Plata; Punta Gorda, Montevideo).—Devincenzi and Legrand, Ann. Mus. Hist. Nat. Montevideo, 1940: pl. 5, fig. 2.—Fowler, Proc. Amer. Philos. Soc. 82 (5): 764. 1940 (Rio de Janeiro); Arq. Zool. Est. São Paulo 3(6): 152. 1941 (Pará, Brazil).

Bloch's description of *saliens* indicates that his specimen had a single row of teeth in the upper jaw (also shown in his figure 335) along with four spines in the first dorsal. On the basis of these two characters I am referring specimens with such a combination of characters to *Oligoplites saliens* (Bloch). In addition, the gill rakers on the lower limb of the first arch of this species are more numerous than on the other species of *Oligoplites* from the Western Atlantic Ocean. They are 16 to 20 instead of 12 to 14.

This is one of the most distinctive species among all those in the genus and can be identified at once by the single row of conical teeth along the premaxillary. The maxillaries in the adults extend past the orbit and form an angle of 40° with the longitudinal axis of the body. The dorsal part of the body is darkish in preserved specimens.

The material examined consists of 7 specimens, all from U. S. National Museum collections, as follows: no. 44701, 1 specimen from the Atlantic coast of Central America; nos. 123073 to 123075, 3 specimens from Gulf of Venezuela; nos. 100824 and 100825, 2 speci-

mens from Porto Inhauma, Brazil; no. 76330, 1 specimen from Rio de Janeiro.

This Atlantic species ranges from Central America, Gulf of Venezuela, and the West Indies southward to Montevideo, Uruguay.

Oligoplites refulgens Gilbert and Starks

Oligoplites refulgens Gilbert and Starks, Mem. California Acad. Sci. 4: 73, pl. 11, fig. 19. 1904 (Panama Bay).—Meek and Hildebrand, The marine fishes of Panama, pt. 2; 392, pl. 39, fig. 2. 1925 (Pacific coast of Panama to Guayaquil).—Jordan, Evermann, and Clark, Rept. U. S. Comm. Fish. 1928, pt. 2: 278. 1930 (Panama).—Fowler, Acad. Nat. Sci. Philadelphia Monogr. 6: 223, fig. 156. 1944 (Playa Muerto, Panama).

Leptooligoplites Fowler, Acad. Nat. Sci. Philadelphia Monogr. 6: 223, fig. 156. 1944. (Genotype—*Oligoplites refulgens* Gilbert and Starks.)

This species may be recognized by its more slender body and numerous gill rakers on the lower limb of the first arch, 17 to 21 instead of 15 or fewer in the other Pacific species. The maxillaries form an angle of about 32° with the longitudinal axis of the body. I have examined large series of specimens, 75 mm and shorter, from Chame Point, Panama, in U.S.N.M. nos. 81986, 82024, and 82025; also 3 small specimens in U.S.N.M. no. 101745, and 1 specimen, U.S.N.M. no. 101744, both from Colombia.

This Pacific species ranges from Panama Bay to Guayaquil, Ecuador.

Oligoplites palometa (Cuvier and Valenciennes)

Chorinemus palometa Cuvier and Valenciennes, Histoire naturelle des poissons 8: 392. 1831 (Lake Maracaibo).

? *Chorinemus guaribira* Cuvier and Valenciennes, Histoire naturelle des poissons 8: 393. 1831 (Brazil).—Günther, Catalogue of the fishes in the British Museum 2: 475. 1860 (coast of Brazil).

Chorinemus saliens (var. *palometa*) Günther, Catalogue of the fishes in the British Museum 2: 475. 1860 (Lake Maracaibo).

Oligoplites saliens palometa Jordan and Evermann, U. S. Nat. Mus. Bull. 47: 899. 1896 (Lake Maracaibo, Venezuela).—? Gilbert, Proc. Washington Acad. Sci. 2: 166. 1900 (Maceio, Brazil).

Oligoplites palometa Jordan, Evermann, and Clark, Rept. U. S. Comm. Fish. 1928, pt. 2: 278. 1930 (Lake Maracaibo).

Scombroides palometa Regan, Proc. Zool. Soc. London, 1903, 2: 66 (Lake Yzabal); Biologia

Centrali-Americana, Pisces: 15. 1908 (Guatemala, Lake Yzabal; Lago de Maracaibo).

Oligoplites saurus Fowler, Proc. Amer. Philos. Soc. 82(5): 764. 1940 (? Rio de Janeiro).

This species is the only one known from the Western Atlantic that has a wide band of villiform teeth on each premaxillary. From *O. saurus saurus* of the Atlantic it differs in having IV spines in the first dorsal instead of V. The maxillaries form an angle of about 40° with the longitudinal axis of the body. The dorsal part of its back is blackish. The anterior portion of the second dorsal fin is blackish and the proximal portion of the anterior soft rays of the anal are blackish. The tips of the rays of the caudal fin are tinged with blackish pigment so as to form a narrow darkish posterior border.

This study was based on U.S.N.M. no. 44205 and nos. 44373 to 44375, 6 specimens from Nicaragua; U.S.N.M. no. 123083, 1 specimen from the Atlantic side of Central America; another small specimen, U.S.N.M. no. 83796, from Trinidad; and 1 specimen each for U.S.N.M. nos. 100817, 100847, and 100851, all from Brazil. Also U.S.N.M. no. 83130, without locality, was collected by the Wilkes Exploring Expedition; 8 specimens from Lago Maracaibo, U.S.N.M. nos. 121803 to 121806, collected by me in 1942, and U.S.N.M. no. 123072, 1 specimen from the Gulf of Venezuela.

This Atlantic species ranges from Nicaragua and Lake Yzabal, Guatemala, and Lake Maracaibo, Venezuela, southward to Rio de Janeiro, Brazil.

Oligoplites saurus saurus (Bloch and Schneider)

Scomber saurus Bloch and Schneider, Systema ichthyologiae: 32. 1801 (Jamaica).

? *Centronotus argenteus* Lacepède, Histoire naturelle des poissons 3: 316. 1802 (Equatorial America).

? *Lichia quiebra* Quoy and Gaimard, in Freycinet, Voyage . . . Uranie and Physicienne, Zool.: 365. 1824 (Equatorial America) (ref. copied).

Chorinemus saltans Cuvier and Valenciennes, Histoire naturelle des poissons 8: 393. 1831 (Martinique).

Chorinemus quiebra Cuvier and Valenciennes, Histoire naturelle des poissons 8: 396. 1831 (Brazil; Martinique; Havana).

Chorinemus occidentalis Günther (not of Linnaeus, as *Gasterosteus occidentalis* Linnaeus is not an *Oligoplites*), Catalogue of the fishes in the British Museum 3: 475. 1860 (Jamaica; San Domingo; Trinidad; Puerto Cabello; Bahía).

Oligoplites occidentalis Goode and Bean, Proc. U. S. Nat. Mus. 5: 237. 1882 (Gulf of Mexico).—Jordan and Gilbert, Proc. U. S. Nat. Mus. 5: 270. 1882 (Pensacola, Fla.).

Scombroides occidentalis (in part) Jordan and Gilbert, U. S. Nat. Mus. Bull. 16: 447, 913, 973. 1882 (Central America, West Indies to New York). (On p. 973 the name is corrected to *O. saurus*.)

Oligoplites rathbuni Ribeiro, Arch. Mus. Nac. Rio de Janeiro 17: (Carang.) 8. 1915 (Bahía).—Fowler, Arq. Zool. Est. São Paulo 3(6): 152. 1941 (Bahía).

Oligoplites saurus Berg. Ann. Mus. Nac. Buenos Aires 4: 38, 1895 (Montevideo).—(in part) Jordan and Evermann, U. S. Nat. Mus. Bull. 47: 898, pl. 138, fig. 378, 1896. 1900 (Tropical America; New York to Florida; West Indies).—Evermann and Marsh, Bull. U. S. Fish Comm. 20, pt. 1: 127, pl. 7. 1902 (Puerto Rico).—(in part) Gilbert and Starks, Mem. California Acad. Sci. 4: 70. 1904 (Florida; Jamaica).—Fowler, Proc. Acad. Nat. Sci. Philadelphia, 1905: 59 (Fort Macon, N. C.; Key West, Fla.).—Jordan and Thompson, Bull. U. S. Bur. Fish. 24: 237. 1905 (Garden Key, Fla.).—Smith, The fishes of North Carolina: 200, fig. 81. 1907 (Beaufort, N. C.).—Starks, The fishes of the Stanford Expedition to Brazil: 43. 1913 (Natal).—Ribeiro, Arch. Mus. Nac. Rio de Janeiro 17: (Carang.) 7. 1915 (Tropical Pacific and Atlantic from New York to Rio de Janeiro; Bahía).—Fowler, Proc. Acad. Nat. Sci. Philadelphia, 1915: 532 (Trinidad); 1919: 147 (Jamaica).—Devincenzi, Ann. Mus. Nac. Montevideo, ser. 2, pt. 5: 217. 1924 (Montevideo).—(in part) Meek and Hildebrand, The marine fishes of Panama, pt. 2: 390, pl. 39, fig. 1. 1925 (Tropical America).—Devincenzi and Baratini, Ann. Mus. Hist. Nat. Montevideo 2: pl. 24, fig. 1, 1928.—Beebe and TeeVan, Zoologica 10(1): 112, fig., 1928 (Port-au-Prince Bay).—Hildebrand and Schroeder, Bull. U. S. Bur. Fish. 43: 219, fig. 128. 1928 (Lynnhaven Roads, Va.).—(in part) Jordan, Evermann, and Clark, Rept. U. S. Comm. Fish. 1928, pt. 2: 277, 1930 (Central America, West Indies to New York).—Nichols, Sci. Surv., Puerto Rico and Virgin Islands, New York Acad. Sci., 10(2): 232, fig. 86. 1929 (Puerto Rico).—Fowler, Proc. Acad. Nat. Sci. Philadelphia, 1931: 398 (Trinidad).—Hubbs, Carnegie Inst. Washington Publ. 457: 253. 1936 (Champton, Campeche; mouth Río Champoton).—Fowler, Proc. Acad. Nat. Sci. Philadelphia, 1937: 310 (Haiti).—Carvalho and Ramos, Bol. Ind. Animal Brazil 4: 24. 1941 (Rio Ribeira de Iguape).—Longley and Hildebrand, Carnegie Inst. Washington Publ.: 535: 83. 1941 (Tortugas).—Carvalho, Bol. Ind. Anim. São Paulo 4 (3, 4): 53. 1941 (Brazil; Uruguay).—Fowler, Arq. Zool. Est. São Paulo 3(6): 153. 1941 (Bahía).—Röhl, Fauna descriptiva de

Venezuela: 399, fig. 213. 1942 (coast of Venezuela).

My observations and comparisons of specimens from both the Atlantic and Pacific sides of Central America indicate that the two populations are slightly different structurally but perhaps no more so than those populations along the coasts from Massachusetts to Rhode Island as compared with that in the Gulf of Mexico to Venezuela. By reference to Table 1 it may be noted that a decrease in the number of gill rakers appears to occur northward on both coasts. However, the series are so small that these differences may disappear when several hundred more counts are made. The only other difference observed by me was the more fully developed middle row of minute teeth in those specimens from the Pacific waters. Other differences may be observed when an extensive statistical study is made but I am unable to devote that much time to this problem at present. Tentatively, I am recognizing them as subspecifically different, but not on very good and substantial facts.

The following material, all in the U. S. National Museum, has been examined by me: no. 16354, 1 specimen from Woods Hole, Mass.; no. 14015, 1 specimen from Long Island, N. Y.; no. 50952, 1 specimen from New Jersey; nos. 20726, 25566, 38277, and 39651, 4 specimens from Rhode Island; nos. 5962, 12690, 21486, 26576, 26598, 26607, 30695, 30858, 31922, 38728, 39869, 44649, 47345, 57285, 68555, 80013, 80014, 83797, and 125691, consisting of a large series of specimens from Florida; no. 127479, 3 small specimens from Alabama; nos. 710, 46291, 73575, 118601 to 118603, and 120074, a small series from Texas; nos. 80036, 80057, 80061, and 80062, a small series from Panama; nos. 4733, 9784, 12556, 82409 to 82413, and 82414, a small series from Cuba; nos. 63053, 73832, 8 specimens from Puerto Rico; nos. 30039 and 30040, 2 specimens from Jamaica; no. 94762, 2 specimens from Puerto Colombia, Colombia; nos. 123076 to 123078, 5 specimens from the Gulf of Venezuela; no. 83434, a specimen, locality uncertain, but probably from Rio de Janeiro.

This Atlantic subspecies has a known range from Woods Hole, Mass., to Florida, the West Indies, the Gulf of Mexico, and Central America southward to Montevideo, Uruguay.

Oligoplites saurus inornatus Gill

- Oligoplites inornatus* Gill, Proc. Acad. Nat. Sci. Philadelphia, 1863: 166 (U.S.N.M. no. 30959 from west coast of Panama).—Jordan, Evermann, and Clark, Rept. U. S. Comm. Fish. 1928, pt. 2: 277. 1930 (Panama).
- Chorinemus inornatus* Günther, Trans. Zool. Soc. London 6, pt. 7: 433. 1868 (Pacific coast of Central America).
- Chorinemus occidentalis* Boulenger, Bol. Mus. Zool. Anat. Comp. Univ. Torino 14(335): 7. 1899 (Bay of Sta. Elena, Ecuador).
- Oligoplites saurus* Jordan and Gilbert, Proc. U. S. Nat. Mus. 5: 625. 1883 (Panama).—Jordan, Proc. U. S. Nat. Mus. 8: 375. 1885 (Mazatlán; Panama).—(in part) Jordan and Evermann, U. S. Nat. Mus. Bull. 47: 898. 1896 (Tropical America to Baja California).—(in part) Gilbert and Starks, Mem. California Acad. Sci. 4: 70. 1904 (Panama Bay; Mazatlán, Mexico).—Hildebrand, Bull. U. S. Bur. Fish. 41: 285. 1925 (El Salvador).—(in part) Meek and Hildebrand, The marine fishes of Panama) pt. 2: 390, pl. 39, fig. 1, 1925 (Panama).—(in part) Jordan, Evermann, and Clark, Rept. U. S. Comm. Fish. 1928, pt. 2: 277. 1930 (Central America to Lower California).—Breder, Bull. Bingham Oceanogr. Coll., 1(3): 17. 1936 (Conception Bay, Baja California).
- Oligoplites occidentalis* Jordan and Gilbert, Proc. U. S. Nat. Mus. 5: 374. 1882 (U.S.N.M. no. 30959, type of *O. inornatus*); Bull. U. S. Fish Comm. 1882, 2: 110. 1882 (Panama).

This species is scarcely distinct from *saurus* of the Western Atlantic, and I separate them subspecifically on the doubtful bases of a little higher average number of gill rakers in the specimens from the Pacific, along with an extra "middle" row of minute villiform teeth on the premaxillary, scarcely developed in *saurus* of the Atlantic.

The following specimens, all in the U. S. National Museum, were examined: no. 131403, off southern California; nos. 41258 and 54571, 9 specimens from Guaymas, Mexico; nos. 28359 and 29208, 4 specimens from Mazatlán, Mexico; no. 87339, 1 specimen from El Salvador; nos. 50450, 79939, 79963, 79966, 80030, 80048, 80056, 80058 to 80060, 81993, and 123082, numerous specimens from Panama.

This Pacific subspecies ranges from southern California southward to Panama and the Bay of Sta. Elena, Ecuador.

Oligoplites altus (Günther)

- Chorinemus altus* Günther, Trans. Zool. Soc. London 6: 433, fig. 1868 (west coast of Panama).—

? Boulenger, Bol. Mus. Zool. Anat. Comp. Univ. Torino 14(335): 7. 1899 (Guayaquil).

Oligoplites altus (in part) Jordan and Evermann, U. S. Nat. Mus. Bull. 47: 899. 1896 (Panama).—Gilbert and Starks, Mem. California Acad. Sci. 4: 72, pl. 11, fig. 20. 1904 (Panama market).—Meek and Hildebrand, The marine fishes of Panama 2: 388, pl. 38, fig. 1. 1925 (Panama).—Jordan, Evermann, and Clark, Rept. U. S. Comm. Fish. 1928, pt. 2: 278. 1930 (Panama).

Two specimens from Panama, U.S.N.M. nos. 80063 and 82043, form the basis on which this study was made.

This Pacific species has been reported from Panama and from Guayaquil, Ecuador.

Oligoplites mundus Jordan and Starks

Oligoplites mundus Jordan and Starks, in Jordan and Evermann, Rept. U. S. Fish Comm. 21: 344. 1896 (Mazatlán) (name only); U. S. Nat. Mus. Bull. 47: 2844. 1898 (San Juan and Algodones Lagoons, Mexico).—Gilbert and Starks, Mem. California Acad. Sci. 4: 72, pl. 12, fig. 21. 1904 (Panama; Algodones Lagoon and Mazatlán, Mexico).—Starks, Proc. U. S. Nat. Mus. 30: 784. 1906 (Guayaquil).—Meek and Hildebrand, The marine fishes of Panama, pt. 2: pl. 38, fig. 2. 1925 (Gulf of California to Ecuador).—Hildebrand, Bull. U. S. Bur. Fish. 41: 285. 1925 (El Salvador).—Jordan, Evermann, and Clark, Rept. U. S. Comm. Fish.

1928, pt. 2: 278. 1930 (Mazatlán).—Tortonese, Bol. Mus. Zool. Anat. Comp. Univ. Torino 47: 162. 1939 (Callao).

Chorinemus saliens ? Boulenger, Bol. Mus. Zool. Anat. Comp. Univ. Torino 14(335): 7. 1899 (Bay of Sta. Elena).—? Steindachner, Denkschr. Akad. Wiss. Wien 72: 126. 1902 (Guayaquil).

Oligoplites altus Jordan and Gilbert, Bull. U. S. Fish Comm., 1882, 2: 106, 110. 1882 (Mazatlán and Panama); Proc. U. S. Nat. Mus. 5: 374. 1882 (on U.S.N.M. no. 30969 from Panama).—Jordan, Proc. U. S. Nat. Mus. 8: 375. 1885 (Panama).—Jordan and Evermann, U. S. Nat. Mus. Bull. 47, pt. 1: 899. 1896 (Panama).

The following specimens were studied: U.S.N.M. nos. 28183, 28354, 28274, 29558, 41257, and 46496, a small series from Mazatlán and the west coast of Mexico; U.S.N.M. no. 87338, a specimen from El Salvador; U.S.N.M. nos. 30738, 30969, 76795, 79936, 79938, 79960, 80027, 80028, and 80051 to 80055, a large series of specimens from Panama; U.S.N.M. nos. 53483 and 88698, 5 specimens from Ecuador.

The entire account by Jordan and Evermann on page 899 in U. S. Nat. Mus. Bull. 47 for *O. altus* appears to have been based on specimens of *mundus*.

This Pacific species ranges from the Gulf of California to Callao, Peru.